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## CENTRAL INTELLIGENCE AGENCY

## INFORMATION REPORT

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Section A - Russian Electronic Development Tasks

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1. It has not yet been possible to determine (after the dissolution of SAG Kabel) the channels through which Soviet orders are passed to the Werk fuer Fernmeldewesen VEB. Sometimes it seems that the Russians are giving up using the plant; some orders have been cancelled and others not accepted because they have not been ready by the specified completion dates. On the other hand, the time for some orders has been extended to the first half of 1954, e.g., the tube microvoltmeter, standard field-generators, and field-strength measuring apparatus. It had been believed that future Soviet orders would be passed through the Ministry of the Interior, but in February 1954 it was reported that they might also come through the Ministry of General and Electrical Engineering.

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2. Secret development tasks for the Soviet Union are now supervised by First Lt. Andexel (fnu) of the Volkspolizei, who works in the Ministry of the Interior. and visits the plant in uniform.

3. Andexel is concerned with, inter alia:

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- a. so-called "pencil" tubes, for all purposes in the 2000 mcs - 3000 mcs range, incorporating the new L-type cathode, and hitherto used only in light equipment such as radiosonde balloons;
- b. two types of teleprinter, one believed to incorporate an automatic coding device similar to that developed during the war by Firma List;
- c. a low noise level travelling wave tube.

4. At the HF Werk, Andexel deals with Director Rudi Mueller, Dr. Guenther Ulrich, Dr. Ignatz Ladurner (tube designer) and Ing. Wilhelm Rieger (Chief of the laboratory for telegraph equipment and a fanatical SED member who was in the USSR for a time until 1951).

25 YEAR RE-REVIEW

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5. Vitaliy Fadeyevich Kozlov, the Russian chief engineer of SAG Kabel's NTB-3, who is responsible for the development of a wattmeter in the 8 - 12 cm. range, gave a contract to supply it to a private engineering concern named Heidecker because the development work in the Wissenschaftliches-Technisches Bureau (NTB-3) of SAG Kabel had not produced any results. In early October 1953, Dr. Phys. Walter Rohde and Krause of VEB Werk fuer Fernmeldewesen HF were invited to NTB-3, to give an opinion on one of Heidecker's instruments. The instrument was built to a Telefunken specification in Heidecker's possession and apparently out of components which he had taken over from old stock. According to Krause, it did not work because, in his opinion, the square cross-section wave-guides (Hohlrohrleitungen) used in it were bound to cut off the frequencies required. Although Kozlov had to recognize that the demonstration of such an inadequate instrument constituted a failure, he honored the financial provisions of his contract with Heidecker.
6. A Soviet official of SAG Kabel headquarters is reported to have said in mid-1953 that if the HF Werk could set up satisfactory production of detectors and transistors, it would receive from the Soviet Union all the germanium it required, as germanium was plentiful in the Soviet Union and was available in bars, like tin.
7. In February 1954, enquiries were made as to whether the HF Werk could undertake the building of ten 10 kw ultrashort wave transmitters during 1954. It was not definitely stated that these were destined for the Soviet Union, but it is considered most probable that they were. It is not yet known whether this order was accepted; there was some opposition to accepting it, owing to the amount of work which the take-over of the building of television transmitters would entail.
8. On 1 February 1954, Kozlov inquired from an engineer in the HF Werk about the possibility of obtaining portable radio-telegraph sets in Germany. He required ultrashort wave or decimeter sets, with a range of 30 to 40 kms, fitted with HT and LT batteries and transportable in boxes. He said that they were required for expeditions working in inaccessible areas. The requirements were similar to those applying to the Signal Unit, Retranslation and "Komet" equipments developed by German engineers in the "Poligon" of MGB Unit 568, near Fenino. The HF Werk's engineer referred him to Dipl. Ing. Werner Kutzsche of Funkwerk Dresden (where development work on ultrashort wave radio-telegraphy is being done), and--as Kozlov intimated that if necessary he would buy in the West--recommended that he contact Telefunken and Philips.

#### Section B - Radio Components

##### 9. Transistors

The fulfilment of the 1953 plan called for the production of twenty specimens, each about as big as a finger. The transistor system is built on a seven-contact pressed-glass miniature tube base, embedded in a filling-paste, the composition of which is not yet known, with a plastic protective cap fitted over the top. An amplifying transistor and an oscillator transistor for 100 kcs were subjected to an endurance test, which, on 16 October 1953, had already lasted for 3,000 hours. At that date, only point transistors were being developed.<sup>2</sup>

##### 10.. Magnetrons

10 cm. magnetrons were called for in October 1953 from the Forschungsinstitut fuer magnetische Werkstoffe (Research Institute for Magnetic Materials) at Jena for the testing of materials and for pure research tasks. They were apparently to be used for investigating magnetic resonance in the centimeter wave region.

##### 11. Antennas

- a. All problems relating to antennas are passed initially to Funkwerk Koenig, which has been given a so-called "global assignment" for the development of antennas. Considerations of expediency then determine whether individual tasks shall be given to other factories.

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- b. Dr. Herbert Bauer is in charge of antenna development in the HF Werk. He and Dr. Erich D. Schuettloeffel have agreed that the HF Werk should carry out all development work on ultra-short-wave antennas.
- c. However, the award to the HF Werk of a task of developing antennas for special purposes was cancelled in October 1953 and allocated to Funkwerk Koepenick. This task appeared to be concerned with directional antennas for jamming transmitters; the specialists at Funkwerk Koepenick were considered to be politically more reliable for such work. It was thought that Dr. Schuettloeffel would probably be entrusted with this task.
- d. In the course of development work on transmitters, it became necessary to use a dummy antenna in the laboratory. Hitherto, no absorbers for high output have been available; Rohde und Schwarz of Munich offered a 10 kw absorber for 10,000 DMW, but this is beyond the means of many factories in the East. Accordingly, the HF Werk was compelled to build itself a 10 kw absorber, and this was satisfactorily done with cooperation from the Dralowidwerk in Teltow.<sup>3</sup> Dr. Matthias Falter produced special resistances of 60 and 70 ohms, about 100 mm in diameter and about 600 mm long, consisting of ceramic tubes covered with a thin layer of sintered (eingebrannt) carbon. Dr. Falter had previously produced resistances of this type in Russia. (He was at Kstovo, Postbox 5.) These resistances cost 1,000 DME each and the complete absorber only 2,000 DME. The absorber is capable of taking a load of 15 kw and the output absorbed is determined by measurements of temperature and speed of flow (Durchflussgeschwindigkeit).
- e. A new problem has arisen in the ultra-short-wave sphere with television antennas which have to be fixed to thick masts, because it is not possible to produce uniform uninterrupted radiation throughout 360° with four antennas, mounted one on each surface of the mast.
- f. Another problem is the development of an ultra-short-wave antenna with special characteristics, including the narrowest possible beam. This is to be used on the North Sea coast.
- g. In January 1954, Dr. Bauer was having great difficulty in adjusting the two antennas on the Mueggelturm, one for television (produced by Elektromessgeraetefabrik Sachsenwerk, Radeberg), and the other for ultra-short-wave radio. The new transmitters, using these antennas, were scheduled to begin operation at the beginning of the Four Power Conference, when the experimental transmitter on the town hall would be taken out of use.<sup>4</sup> (The Mueggelturm is in southeast Berlin, between Berlin-Koepenick and Berlin-Mueggelheim.)

## 12. Semi-conductors

The center of the development work on semi-conductor products has been moved from the HF Werk to the Dralowidwerk Teltow (Dr. Falter). However, an engineer in the HF Werk has received a subcontract to resolve technological questions relating to detector crystals. Under this contract, Dr. Helmuth Boehm will continue the development of transistors and produce a small number of them.

## Section C - Instrument Construction

### 13. Counter tubes

On 15 December 1953, there was a meeting of the Working Group for Physical Measuring Methods (Arbeitsgruppe Physikalische Messmethoden) under the chairmanship of Professor Paul Kunze of Rostock. The main item on the agenda was methods of impulse-counting. Deutsche Glimmlampengesellschaft of Leipzig (formerly Pressler) and another unspecified firm in Dresden were producing impulse-counters with mechanical counting mechanisms. Professor Kunze was interested in the possibility of developing, in East Germany, electronic counting mechanisms associated with Geiger counter tubes. Albert Thurley suggested that the HF Werk could undertake this work.

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14. Field-strength meters for Hungary

On 30 December 1953, the Deutscher Innen-und Aussenhandel (DIA) accepted two field strength meters destined for Hungary and despatched them by air mail. One had a range of 20 to 100 mcs and the other 90 to 360 mcs. In order to keep to the delivery date, two instruments were hastily prepared; they were not in the best condition and had not even been subjected to all the prescribed acceptance tests.

15. Television probe for bore holes

In Christmas week 1953, Dr. Rost (fnu), chief geologist of Aussenstelle Mitte (Invalidenstrasse 46) of the State Geological Commission, visited the HF Werk in the hope of obtaining support for a proposal in connection with the geological survey of East Germany. It was suggested that bore holes should be drilled to a depth of 3,000 m. and that the drill head should be equipped with a camera. Dr. Rost proposed that a television camera should be used. This would have to operate in a very small space under 300 atmospheres, at a temperature of more than 100° C, in sludge. The bottom and walls of the bore holes would be photographed, the latter by means of a prism. Water would be used for cooling and cleaning to give visibility. An iris diaphragm would remain closed until all pre-conditions for visibility were met. Deep-sea research and use of the camera in the Soviet Union were possible future developments. After consultation with his specialists, Dr. Ulrich said he was prepared to cooperate in the project and estimated the costs of preliminary development in 1954 at 150,000 DME; the final development could then begin in 1955. Dr. Rost promised to see to it that the money would be made available and that the contract would be awarded to HF Werk.

16. Impulse transmitter for Freiberg Mining Academy

An order to develop an impulse transmitter (Impulsfunker) was received from Professor Friedrich Leutwein of the Freiberg, Saxony, Mining Academy in January 1954. The technical requirements are: duration of impulse 0.5  $\mu$ sec; power 3 mw. In order that work may begin at once, Professor Leutwein is paying 10,000 DME out of his Institute's funds. Later, the State Planning Commission will officially allocate the task to the HF Werk and finance it. The need for this instrument will arise in spectrum analysis, with the stimulation of greater electron flow (hoeherer Elektronenuebergaenge). About three years ago, Professor Leutwein ordered and received from the HF Werk a similar impulse transmitter, but it did not produce a sufficient power output. Dr. Phys. Walter Rohde and Ing. Erwin Voss will go to Freiberg to discuss technical details.

Section D - Television Transmitters

17. The 3 kw television transmitter for Dresden/Radeberg was scheduled to be completed by 15 October 1953, but in mid-November great pressure had to be put on to have it installed and ready for use at the end of the year, by which time its aerial mast was expected to be ready. This transmitter is a reproduction of the one delivered to and put into operation at the Leipzig Autumn Fair in 1953. When it was being built, no transmitter tubes were available in East Germany and Telefunken tubes had to be obtained at a cost of 30,000 DMW. Reproductions of these tubes are to be made for the future Berlin transmitter by VEB Funkwerk Erfurt. The Berlin station is to have a frequency of between 40 and 60 mcs. The 73 meter-high steel lattice television transmitting antenna mast has, halfway up, a platform to carry paraboloid reflectors for the decimeter beam links and, two thirds of the way up, an antenna array for ultra-short-wave radio. The ultra-short-wave transmitter was built by the HF Werk and had been delivered by 18 November 1953. On 19 December 1953, the prearranged inspection of the transmitter eventually took place in the HF Werk. Those present included representatives of the Government, SED, and the electrical industry. Dipl. Ing. Rehbock gave an introductory talk on the servicing, components, and special features of the new transmitter, which was followed by a demonstration with a test picture and film reproduced by receivers in an adjoining room. Rehbock stated, among other things, that only small modifications would be necessary to adapt the transmitter for use in the 140 to 200 mcs range. At the moment, for use in Dresden,

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the set is tuned to transmit pictures at 145.25 mcs. at 1.3 kw, and sound at 151.75 mcs at 250 W. By the later addition of a final amplifier stage, the power would be increased to 4 kw and 750 W respectively; at the moment, only 1 kw is required, later to be increased to 3. The production of the stationary image (Restbild) was so good that the lines could be increased to 800.<sup>5</sup>

18. A meeting took place in the HF Werk on 22 December 1953 to reach agreement with the Sachsenwerk Radeberg about the production of four 10 kw television transmitters during 1954. A year previously, the HF Werk had obtained the development contract for this type of transmitter through Alfred Adler of the Ministry of Posts and Telecommunications, but later Gerhard Megla succeeded in making Adler change his mind and promise the construction contract for the four transmitters to Sachsenwerk Radeberg. As a result, Radeberg demanded that the HF Werk should hand over the designs so that they could build the transmitters. The Ministry decided that, in the event of a crisis, workmen in Dresden would be less likely to flee to the West than those in Berlin. The HF Werk did not agree with these proposals, and decided to seek a solution from the Council of Ministers. The HF Werk will put the set at present under development into action in August 1954. A section of 35 men is busy on the laboratory work, and there is enough capacity free in the testing workshop to carry out the required mechanical work. In February 1954, the management of the HF Werk hoped that the defects which had appeared in the transmitters produced by Sachsenwerk Radeberg would decide this conflict over the further development of a high-powered transmitter (up to 30 kw) in favor of the HF Werk.

#### Section E - Miscellaneous Items

#### 19. Fulfillment Conference in Karlshorst

The Ministry for General and Electrical Engineering held a conference on fulfillment dates on 27 November 1953, in a Conference Room at Berlin Karlshorst, Waldowallee 35. This house is one of a row (30-36), with seven entrances. Passages interconnect the houses on all floors. The large gathering included representatives of many factories in East Germany; deputies from the Deutsche Reichsbahn (East German nationalized railways) and other transport organizations; Dr. Heinrich Weber, representing Funkwerk Koepenick; Referent Hecker (fnu) and Sachbearbeiter Boehm (fnu) of the Planning Commission; N.L. Bebenin, the head of the Administration of the Soviet Property in Germany (USIG); a Russian technician named Pivin; and a Russian secretary and interpreter. The subjects discussed included high-speed power units (apparently turbines); a testing bench for racing motors (Pruefstand fuer Rennmotoren); a torsion balance for determining the torque of transmission shafting and balance machines for the examination of motors. Sachbearbeiter Boehm spoke on behalf of the HF Werk concerning the 26 tasks ordered by the Russians, the specified completion dates, delays to be expected before delivery, and reasons for the delays. In most cases, he attributed the delays to the time taken by the Russians in answering queries on the details of the tasks, which had to be cleared up before work could start. At the end of the conference, the chairman said that compliance with fulfillment dates would be more strictly enforced in the future, and the progress of developments would be the subject of continuous supervision and report.

#### 20. Shortage of Materials in East Germany and Power Economies

It was learned in January 1954 that the State Committee for Material Planning was proposing to issue regulations imposing economy in the use of nonferrous metals. The use of copper and its alloys for consumer goods and building purposes would be prohibited, and in machine-building, quantities used would have to be reduced by 10%. In the electrical industry, the use of brass would be permitted only for sliding contacts. No copper wire would be permitted in transformers below 1600 kva; in all cases where copper is used merely because of its high conductivity, and for jumper-wire, condenser-plates, coils and concentric element tanks in radio installations, copper would be replaced by other metals. The use of copper

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wire of less than 0.5 mm diameter in coils and transformers would still be allowed. Individual plants would be allowed to hold stocks of copper and its alloys sufficient for only three months. On 4 February 1954, heads of departments in the HF Werk were firmly told by the Dep. Min. for Power that electricity was not to be used after 17:00 hours. The only exception to this rule was for shift work in the production sections.

#### 21. SAG Kabel

The head office of SAG Kabel in the Knorrbremse building at Ostkreuz was officially disbanded on 1 January 1954. At the end of January, the chief engineer, Valentin Semenovitch Mateyshenko, paid a final visit to Dr. Guenther Ulrich in the HF Werk. The acceptance official, Ivanov (fnu), is remaining in Berlin for the time being, because some tasks are not yet completed. It was rumored that NTB-3 was also to be liquidated, and ideas were current about acquiring space and stock for the HF Werk, as its instrument departments are in the same building and want more room on account of the big television transmitter commitments. However, on 3 February 1954, Dr. Ulrich said that NTB-3 was to continue and would work on various ultra-short-wave measuring techniques.<sup>6</sup>

#### 22. Cancellation of Premiums

In a conference in Director Rudi Mueller's office in January 1954, it was announced that, although the number of tasks had been reduced in August 1953, the experimental divisions had only fulfilled 79% of their plan and, therefore, the workers would not be paid premiums. (The tube division had reduced its plan more severely and had over-fulfilled it by 7%). The FDGB representative present did not agree with this cancellation of premiums and demanded an investigation of the planning and the identification of those at fault. Director Mueller turned this down, however, and Dr. Ulrich agreed with him, saying that during the last year, salaries in the experimental division had been appreciably increased, so that now premiums must be foregone.<sup>7</sup>

#### 23. Walter Ulbricht's visit

In connection with the Foreign Ministers' conference, Walter Ulbricht, the Deputy Prime Minister, visited the HF Werk to address the workers, with a view to raising morale and stimulating support for Molotov's proposals. The speech was broadcast over the plants' public address system at four o'clock in the afternoon, but as this system only works properly in the NEF section, other workers only heard about Ulbricht's visit and speech afterwards. He came in a ZIM car [redacted] and his entourage filled two other cars. The press were present in force, but the HF Werk employees did not take much notice of the visit.

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#### Section F - Tasks for 1954

24. The management of the HF Werk is counting on starting the following tasks in the current year:

##### a. Ministry of the Interior

Development of output meters for the 3 cm and 10 cm wavelengths.

##### b. Deutscher Innen- und Aussenhandel (DIA) and Poland

In the middle of January 1954 a written inquiry was received from Deutscher Innen- und Aussenhandel Elektrotechnik as to whether the HF Werk was in a position to supply a television transmitter with studio equipment to Poland. After reference to Dr. Guenther Ulrich, an affirmative answer was given. On 27 January 1954, a Polish representative appeared, who wanted to find out about the capabilities of the HF Werk. His name was Rymczk (fnu), and he was a tall, thin, engineer, aged about 40 and well-informed on the latest

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developments in the television field. He visited the television department and concerned himself with transmitters, studio equipment and tubes. Thereafter, he had a talk on commercial aspects with Director Rudi Mueller.

c. VEB Messgeraete-Entwicklung (EFEM)

VEB Messgeraete-Entwicklung (formerly SAG Kabel's NTB-4), under Director Josef Stanek, has ordered a high power oscillograph, with a maximum recording speed of 50,000 km/sc for one-time processes.

d. Funkwerk Leipzig-Flagwitz

The Funkwerk Leipzig-Flagwitz, under Dr. Franz Heinrich Lange, has ordered a 10 cm signal generator for the laboratory of Dr. Huettel (fnu) (formerly of Telefunken).

e. Television Receivers

Development on television receivers will be carried out in association with Sachsenwerk Radeberg, which has already brought out a receiver, called the Rembrandt, for 1300 DME. Series production of sets will continue in Radeberg.

f. Measuring Instrument for Heavy Impulses

An order has been received from the East German government for a measuring instrument for heavy impulses with a very short build-up time.

Section G - Forthcoming Chinese Contract

- 25.. After the visit to the HF Werk last year of a Commission from Communist China, an inquiry has now been received from Dr. Wang (fnu) in Peiping. Dr. Wang, who studied in the USA and Germany, is the Chinese Government's Adviser on Communications. He announced that his forthcoming visit would be for the purpose of discussing details of the contract which the Chinese Government wishes to give to the HF Werk. This comprises the supply of 560 centimeter measuring circuits (Messleitungen) for the range 8 to 12 cm, but working with precision only between 9 and 11 cms.<sup>8</sup>

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26.

travelling wave tubes are in production at OSW

- (a) Two types of travelling wave tubes are being developed in the HF Werk, one an amplifier for low-power stages of receivers and the other a power amplifier; both are for use in decimeter and centimeter wave bands. As a result of this development, it is expected that it will be possible to build decimeter relay stations without IF amplifiers. The Ministry of the Interior is greatly interested in this matter and First Lt. Andexel inquired some time ago how it was progressing. It may be inferred that this development is of military significance (wireless beam links).

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- (b) A panoramic receiver is a monitoring receiver, working with an aerial without horizontal polarization (Richtwirkung), which is worked over the frequency range under investigation, thereby giving a survey of the whole range. It is possible that a monitoring receiver of this type is being developed in Funkwerk Koepenick, but no details are known. Some time ago Wilhelm Grimm had a contract to design a set of this type, which would work on short or ultra short wave lengths, but production was to be carried out by Messgeraetewerk Zwoenitz. The HF Werk has a similar development contract for a spectral-analyzer for 50 to 100 mcs. This set has a reception sensitivity of 2  $\mu$ V at 70 ohms, and wobbles the listed frequency to which it is tuned

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over  $\pm 150$  kcs; the frequency spectrum over this range is shown on a tube. In this way it is possible to compare two adjacent frequency modulated transmitters or to determine the modulation characteristics of one of the transmitters.

27.

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Nothing is known of a VEB Roehrenwerk Senftenberg. There is a rectifier factory in Gross-Raeschen near Senftenberg, producing mainly selenium rectifiers. Moreover, Dr. Friedrich Eckart was incidentally concerned with the further development of rectifiers, and his assistant, Frl. Dr. Schmidt (fnu), still works at the Gross-Raeschen plant and travels there now and again. It is possible that the chief of the HF Werk, Dr. Kurt Richter, has contacts in Gross-Raeschen.

28.

87 to 100 mcs ultrashort wave transmitters 25X1

Delivery of the original order for 13 sets has now been completed. The Post Office ordered two more sets, because it had to give up two (which it is believed have gone to the Russians); these are being supplied. Of the 11 retained by the Post Office, one is used experimentally and 10 are being installed as part of the ultrashort wave wireless system. All sets were supplied with a 1 kw final stage. Dipl. Ing. Rehbock advised against a subsequent amplification stage of 3 kw and proposed instead that the 1 kw stage itself should be modified to produce 10 kw. A complete 1 kw set was shown at the Leipzig Fair and an illustration of the equipment appeared in the December 1953 or January 1954 number of "Deutsche Funktechnik." That set is now in the HF Werk for test purposes.

29.

the current zirconium and germanium supply position 25X1

(a) Zirconium

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The HF Werk's requirements of getter material for at least a year were assured by the chance discovery in September 1953 of about one kilogram of zirconium, in the Funkwerk Koeponick. This had presumably been buried during the war, to safeguard it against the danger of fire. The anodes of radiation-cooled transmitting tubes are sprayed with zirconium, which is most effective as a getter at temperatures between 500° and 700° C. In the case of tubes with external anodes, the grid is coated with zirconium.

(b) Germanium

In October 1953, 186 grams of germanium powder were obtained through the Deutscher Innen- und Aussenhandel organization and, at the beginning of November, a further 500 grams of germanium dioxide arrived from the same source.

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Comments:

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1. The Post had to surrender two out of an order for eleven 1.6 kw ultrashort wave sets built by the HF Werk, and it is thought that these were handed over to the Russians. The Post subsequently ordered two more.
2. According to previous information, these are for the USSR.
3. Dralowidwerk Teltow is now called VEB Werk fuer Bauelemente der Nachrichtentechnik "Carl von Ossietzky."
4. The town hall referred to is the Koenigstrasse town hall, East Berlin.

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Comments (Con't):

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5. Television reception in East Berlin is unsatisfactory. The 1.6 kw ultra-short wave transmitter on the Mueggelturm (mid-way between Berlin Koepenick and Berlin Mueggelheim) broadcasts on 98.2 mcs, which is in the immediate proximity of the old television transmitter. The new television transmitter on the Mueggelturm works on 41.75 mcs, which lies in the range of disturbances caused by therapeutic and heat generators all over the city.
6. The only specialists in NTB-3 have little knowledge of the ultra-short-wave range, and, since Dyakonov's death, there seem to be no skilled workers among the Russians either, so no interesting results are to be expected from that organization.
7. This decision will probably cause ill-feeling and departures of personnel are to be expected. The present sickness figure of 30% is an expression of passive resistance.
8. It is suggested that this order must be for the equipment of at least 100 radar workshops.

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